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FIRST QUARTERLY STATUS REPORT

ON

EXPERIMENTAL STUDIES FOR THE DETECTION OF PROTEIN
IN TRACE AMOUNTS (J-BANDS)

OTS PRICE

XEROX

\$

1/10 ph

MICROFILM

\$

Contract No. NASr-84

Reporting Period: 1 February 1962 - 30 April 1962

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Nine cyanine and carbocyanine dyes were tested for J-band formation with gelatine over the pH range 1 to 12. Of these dyes only 3,3'-diethyl-9-methyl-4,5,4',5'-dibenzothiacarbocyanine bromide (I) gave a J-band. Dyes which had structures similar to I, except that they were not substituted at the 4,5,4',5' position, did not respond. Carbocyanine dyes substituted at the 4,4' and/or 5,5' position are being synthesized and will be tested at the end of the second quarter.

Aqueous solutions of I were found to be light sensitive. When exposed to room light for several hours, the solutions changed from a deep fuchsia color to a light yellow color. However, a 24-hour exposure to light with a wavelength of 6500 \AA (the adsorption peak of the J-band) had no effect. No significant decomposition of the dye was evident over a 60-day period when aqueous solutions were stored at room temperature in brown glass bottles covered with aluminum foil. Aqueous solutions of I protected from light and kept at 100°C for 96 hours rapidly deteriorated. Other solutions stored at 60°C slowly bleached and solutions maintained at 40° , 22° , or 4°C did not change appreciably. The heat sensitivity of the dye solution was not altered by the addition of 0.002 percent gelatin to the dye solution. Over the pH range 5 to 9, aqueous solutions of I were stable, but at a pH of less than 5, the dye quickly bleached to a colorless solution, and at a pH greater than 9 it turned bright blue. J-bands were formed with gelatine only over the pH range 5 to 9. When tested with gelatin at a pH of 7.0, the most intense and clearly defined J-bands were formed at a dye concentration of $4 \times 10^{-5} \text{ M}$.